Standard Methods of Input

- Keyboard
- Mouse

Input device → enables you to input information and commands into the computer.

The Keyboard

One of the first peripherals to be used with a computer and is still the primary input device for text and numbers.

Standard Keyboard Layout

Most keyboard layouts are identical.

- **Alphanumeric keys**
  Parts of a keyboard that look like a typewriter. Common arrangement is called QWERTY (first 6 keys along the top row). Along with letters and numbers there are a few additional keys with specific functions.
  - Tab
    Moves you to predefined stops within application programs. In dialog boxes it moves you to the next option or field.
  - Caps Lock
    Lets you lock the alphabet keys so that they produce only capital letters. This does not affect the numerical keys.
  - Backspace
    Key enables you to erase characters just typed.
  - Enter (or Return)
    Lets you finalise data entry in many application programs. Also used to choose commands and options.
- **Modifier keys**
  Keys used to modify the input of other keys
  - Shift
    Shift + alphabet key = Capital
    Shift + numeric key = Symbol
    E.g. Shift + 7 = &
  - Ctrl
    Control produces different results depending on the program you are using. E.g. Ctrl + O = Open new file.
  - Alt

Acts like the ctrl key but gives different results. In many windows applications Alt + key enables you to navigate w/o using the mouse.

Macs have 2 additional keys

- Command
- Option (or Alt/Option)

- **Function Keys**

  F1, F2 etc. arranged in a row along the top of the keyboard allow you to input commands without typing strings of characters.

  PC keyboards usually have 12 function keys, Macs have 15.

- **Cursor movement keys**

  Allow you to move around the screen

  - Arrow keys

    4 keys labelled by an arrow pointing in a specific direction.
  - Home/End

    Home moves the cursor to the start of a line, End moves it to the end of the line (program dependant)
  - Page Up/Down

    PgUp and PgDn allow you to flip through documents screen by screen.

- **Special purpose keys**

  - Insert

    Used to switch a program from **insert mode** to **overwrite mode**.
  - Delete

    Used to delete characters from a document. Used alone it deletes single characters, used with the modifier keys it can remove multiple characters of text.
  - Esc

    Typically used to **back up** one level in a multilevel environment.
  - Print Screen

    Allows the user to capture what is shown on the screen as an image.
  - Scroll lock

    Usually controls the functions of the cursor movement keys.
  - Pause

    Used to stop a command in process.

  Since 1996 all keyboards also contain 2 special purpose keys to work with windows.

  - Start

- Shortcut

How a computer accepts input from the keyboard.

1. Key is pressed on the keyboard.
2. Keyboard controller sends scan code for the key to the keyboard buffer.
3. Keyboard buffer sends interrupt request to the system software.
4. System software responds to the interrupt by reading the scan code from the keyboard buffer.
5. System software passes the scan code to the CPU.

The Mouse

An input device that rolls around on a flat surface and controls the **pointer**. The pointer is an on screen object (usually an arrow) that is used to select text, access menus and interact with programs, files or data that appears on the screen.

The mouse was first packaged with the Apple Mac in 1984. Instead of forcing you to type or issue commands from the keyboard the mouse and mouse based Operating Systems let you choose commands from east to use menus and dialog boxes.

Using the mouse

Use the mouse to point at a location on the screen. Push the mouse forward on the desk → the pointer moves upward on the screen. Everything to do with a mouse is accomplished by combining pointing with 4 other techniques.

- Clicking
- Double clicking
- Dragging
- Right Clicking

Macs have only one button whereas most PC mouse have 2 buttons. A recent enhancement is the wheel mouse.

Variants of the mouse

Primary goal → provide ease of use while taking up less space than a mouse. They remain stationary and can even be built into the keyboard.

1. **The trackball**

   Pointing device that works like an upside down mouse. Rest your thumb on the exposed ball and to move the pointer around the screen you move the ball with your thumb.

   When space is limited a trackball can be an advantage. Gained popularity with the advent of laptop computers.

2. The **trackpad** (or **touchpad**)

   A stationary pointing device that some people find less tiring than a mouse or trackball. Movement of a finger across a small touch surface is translated into pointer movement on the computer.

   Size makes it suitable for notebook computers. Usually separate from the keyboard in desktop computers.

   Drawback → must be kept clean and static free. Build up of dust and oils from users fingers can reduce the sensitivity of the trackpad and unwanted static charge can make it behave erratically.

3. **Pointers in the keyboard**

   Small joystick positioned near the centre of the keyboard – typically between the g and the h keys. Joystick is controlled with either forefinger.

Non standard methods of Input

Hand

- Pens
- Touchscreen
- Game controllers

Optical

- Bar code readers
- Image scanners and optical character recognition

Audio visual

- Microphones and speech recognition
- Video input
- Digital cameras

Pens

Use a pen (or **stylus**) for data input. Hold the pen in your hand and write on a special pad or directly to the screen. Also can be used as a pointing device like a mouse.

Pen based systems are not generally used to enter large amounts of text because handwriting recognition is so complex. They are frequently used for note taking and creating short messages.

More commonly used for data collection where the touch of a pen may select a check box. Another common use is inputting signatures or messages that are stored or transmitted.

Touchscreens

Accept input by allowing the user to place a fingertip directly on the computer screen to make a selection. Most touchscreens use sensors in or near the computer screen to detect the touch of a finger.

Useful in an environment where dirt or weather would render keyboards or pointing devices useless. Well suited to simple applications such as ATMs or public information kiosks. Have become popular in fast food restaurants, department stores and supermarkets.

Game Controllers

Can be considered an input device because a computer game is a program. It accepts input from the user, processes data and produces output in the form of graphics and sound.

Game controllers generally fall into 2 categories

- Game pads
  Small flat device with 2 sets of controls, devices are flexible and are used to control many game systems.
- Joysticks
  Popular in racing and flying games.

Bar code readers

Most widely used input device after the keyboard and mouse. Most common type of barcode reader is the flatbed model commonly found in supermarkets.

Delivery services such as FedEx also use handheld barcode readers to identify packages in the field.

Devices convert a barcode – a pattern of printed bars – into a code that the computer can understand. The barcode reader emits a beam of light that is reflected by the barcode image. A light sensitive detector identifies the bar code image by recognising special bars at both ends of the image. Both these bars are different so the reader can tell if the bar code is being read the right way up.

After identification the barcode is converted into numeric digits that are fed into the computer as if a number had been typed on the keyboard.

Image scanners and optical character recognition

A bar code reader is just a special type of image scanner.

Scanners convert any printed image into electronic form by shining a light onto the image and sensing the intensity of the reflection at every point.

Colour scanners use filters to separate the components of colour into the primary colours at every point.

If you have scanned a text document you might want to use Optical Character Recognition (OCR) software to translate the image into text that you can edit.

When a scanner first creates an image from a page it is stored in the memory as a bitmap. The job of the OCR software is to translate the array of dots into text that the computer can interpret as letters and numbers.

Scanners come in a range of sizes from handheld models to flatbed scanners. Handheld are more portable but typically require multiple passes over a page. Flatbeds offer a higher quality reproduction and can scan a page in a single pass.

Microphones and speech recognition

Now that sound capabilities are standard in computers microphones are becoming increasingly important as input devices to record speech.

For sound input you need a microphone and a sound card that translates the analogue signal (sound waves) from the microphone into digital codes that the computer can store and process. This process is called digitising.

There is also a demand for translating spoken words into text. This capability is known as speech (or voice) recognition. You can use it to dictate to the computer instead of typing.

Newer generation speech recognition programs are much more reliable. Some packages accurately recognise 80% of spoken words. The user may need to "train" the software to recognise speech patterns. Speech recognition packages usually require the use of a noise-cancelling microphone.

Video input

PC video cameras digitise images by breaking them into individual pixels. Each pixels colour and other characteristics are stored as a digital code. This code is then compressed so that it can be stored on disk or transmitted.

Many PC video cameras attach to the top of the screen enabling the user to capture images of themselves while working at the computer. Using a video capture card the user can also connect other video devices enabling transfer of images from video equipment to the computer.

Digital cameras

Work similar to PC cameras except that they are handheld devices that capture still images. Normal film cameras capture images on specially coated film, digital camera capture images electronically.

The digital camera digitises the image, compresses it and stores it on a special disk or memory card. The information can then be copied, printed or used in a document.

Moving digital images from camera to PC is a simple process using standard cables, disks or infrared network capabilities.